Hyperoxia may be beneficial

Titre	Hyperoxia may be beneficial
Type de publication	Article de revue
Auteur	Calzia, Enrico [1], Asfar, Pierre [2], Hauser, B. [3], Matejovic, M. [4], Ballestra, C. [5], Radermacher, P. [6], Georgieff, M. [7]
Editeur	Lippincott, Williams & Wilkins
Type	Article scientifique dans une revue à comité de lecture
Année	2010
Langue	Anglais
Date	2010
Numéro	10 Suppl
Pagination	S559 - 68
Volume	38
Titre de la revue	Critical Care Medicine
ISSN	1530-0293
Mots-clés	Humans [8], Hyperoxia/metabolism/physiopathology [9], Inflammation/metabolism/physiopathology [10], Oxidative Stress/physiology [11], Oxygen Inhalation Therapy/methods [12], Oxygen/blood [13], Respiration, Artificial/methods [14], Sepsis/blood/physiopathology [15], Shock, Septic/blood/physiopathology [16], Ventilator-Induced Lung Injury/physiopathology/prevention & control [17]

Résumé en anglais	The current practice of mechanical ventilation comprises the use of the least inspiratory O2 fraction associated with an arterial O2 tension of 55 to 80 mm Hg or an arterial hemoglobin O2 saturation of 88% to 95%. Early goal-directed therapy for septic shock, however, attempts to balance O2 delivery and demand by optimizing cardiac function and hemoglobin concentration, without making use of hyperoxia. Clearly, it has been well-established for more than a century that long-term exposure to pure O2 results in pulmonary and, under hyperbaric conditions, central nervous O2 toxicity. Nevertheless, several arguments support the use of ventilation with 100% O2 as a supportive measure during the first 12 to 24 hrs of septic shock. In contrast to patients without lung disease undergoing anesthesia, ventilation with 100% O2 does not worsen intrapulmonary shunt under conditions of hyperinflammation, particularly when low tidal volume-high positive end-expiratory pressure ventilation is used. In healthy volunteers and experimental animals, exposure to hyperoxia may cause pulmonary inflammation, enhanced oxidative stress, and tissue apoptosis. This, however, requires long-term exposure or injurious tidal volumes. In contrast, within the timeframe of a perioperative administration, direct O2 toxicity only plays a negligible role. Pure O2 ventilation induces peripheral vasoconstriction and thus may counteract shock-induced hypotension and reduce vasopressor requirements. Furthermore, in experimental animals, a redistribution of cardiac output toward the kidney and the hepato-splanchnic organs was observed. Hyperoxia not only reverses the anesthesia-related impairment of the host defense but also is an antibiotic. In fact, perioperative hyperoxia significantly reduced wound infections, and this effect was directly related to the tissue O2 tension. Therefore, we advocate mechanical ventilation with 100% O2 during the first 12 to 24 hrs of septic shock. However, controlled clinical trials are mandatory to test the safety and efficacy of this approach.
URL de la notice	http://okina.univ-angers.fr/publications/ua8273 [18]
DOI	10.1097/CCM.0b013e3181f1fe70 [19]
Lien vers le document	http://dx.doi.org/10.1097/CCM.0b013e3181f1fe70 [19]
Titre abrégé	Crit Care Med

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[19] http://dx.doi.org/10.1097/CCM.0b013e3181f1fe70